

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representation of
The original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

(12) UK Patent Application (19) GB (11) 2 282 786 (13) A

(43) Date of A Publication 19.04.1995

(21) Application No 9321404.7

(22) Date of Filing 16.10.1993

(71) Applicant(s)

Rover Group Limited

(Incorporated in the United Kingdom)

**International House, Bickenhill Lane, Bickenhill,
BIRMINGHAM, B37 7HQ, United Kingdom**

(72) Inventor(s)

Russell Smith

(74) Agent and/or Address for Service

Alan S Wilson

**Rover Group Limited, Gaydon Test Centre,
Banbury Road, Lighthorne, Warwick, CV35 0BL,
United Kingdom**

(51) INT CL⁶

B60K 5/10

(52) UK CL (Edition N)

B7H HDJ HDK H745

(56) Documents Cited

US 4766777 A

US 4502279 A

(58) Field of Search

UK CL (Edition L) B7H HDJ HDK

INT CL⁵ B60K 5/10, F16H 57/02, F16M 1/02

Online database: WPI

(54) Engine and transmission assembly.

(57) An engine 10 has a mounting face 16 for a transmission 20 which is surrounded by a rim 18 having a plurality of circumferentially extending slots 28 which are tapered and have an opening at one end. The transmission 20 also has a rim 26 on the edge of the clutch bell housing 24 which fits inside the rim 18 on the engine and has a plurality of radial tapered projections 30. To assemble the transmission to the engine the projections are passed through the openings into the slots 28, and the transmission is rotated so that the projections become wedged in the slots. Wedge shaped locking members 48 are then placed in the slots behind the projections and drawn inwards by screws 52 to urge the projections into the slots and retain them there.

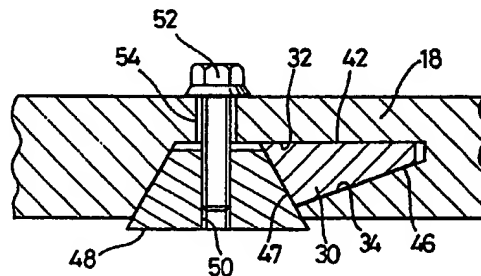


Fig. 4

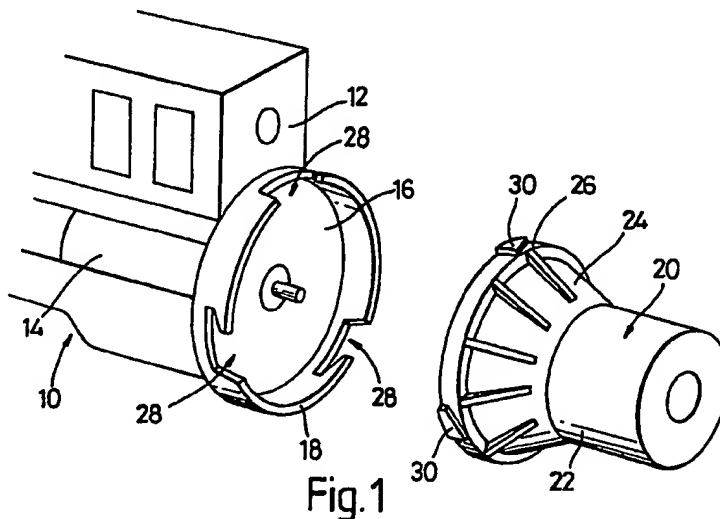
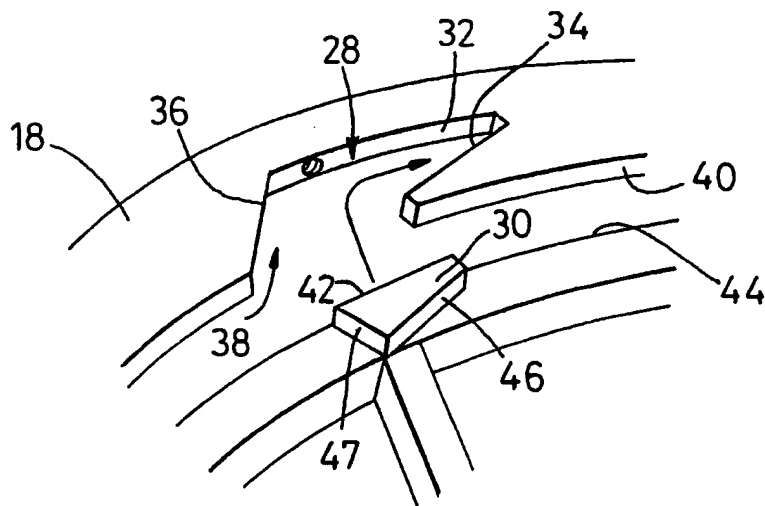
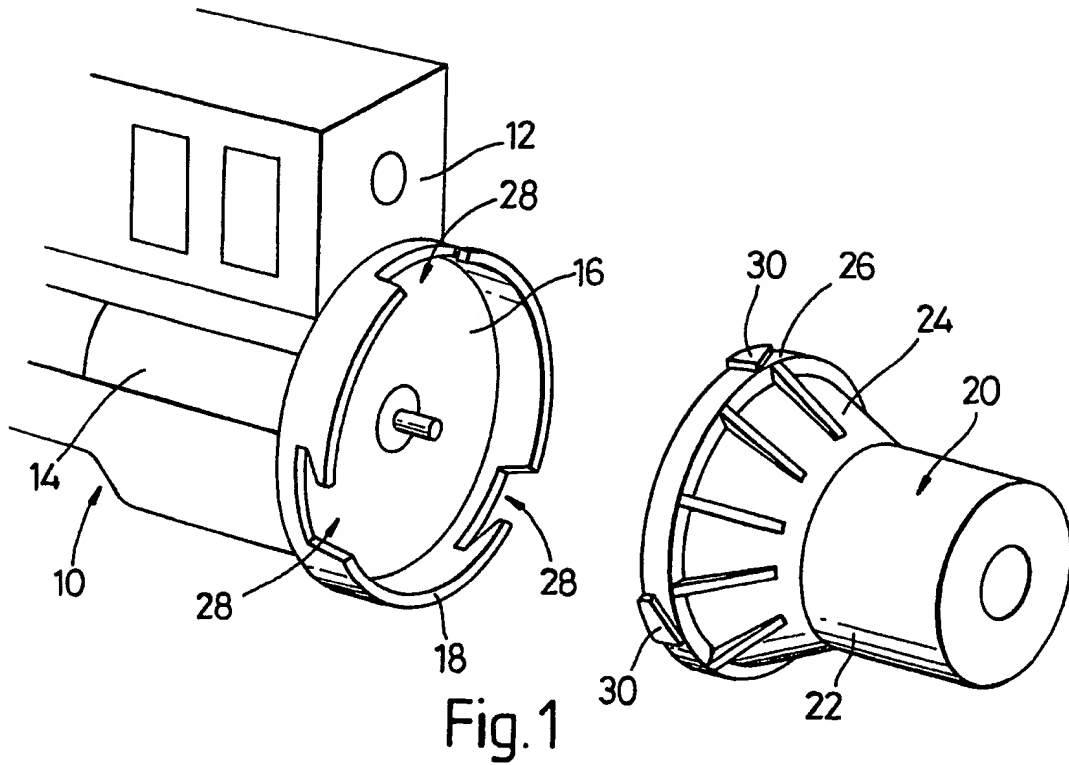


Fig. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

1/2



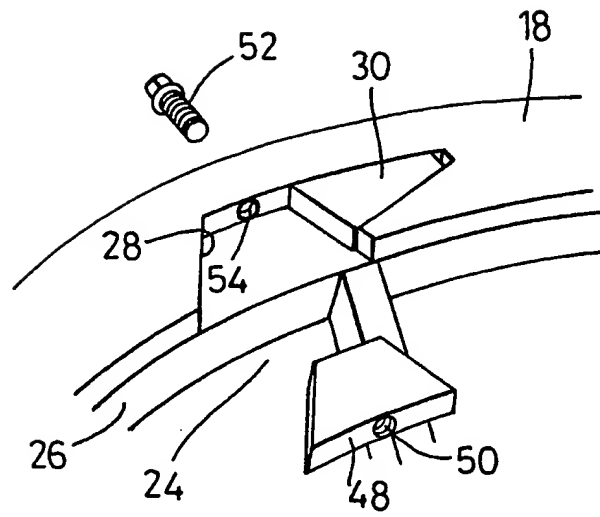


Fig. 3

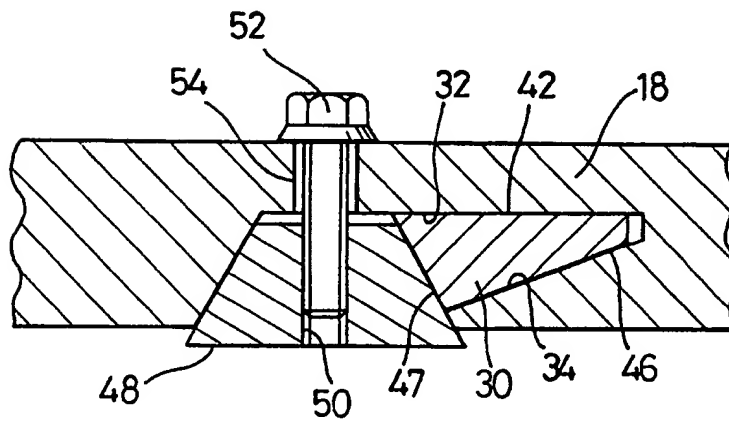


Fig. 4

ENGINE AND TRANSMISSION ASSEMBLY

The present invention relates to the assembly of transmissions to engines.

Generally, to attach a transmission to an engine the transmission casing and the engine block are brought into contact and bolted together. This method is effective but somewhat labour intensive as the bolts have to be numerous enough, strong enough, and accurately placed enough to locate the transmission relative to the engine and hold it in place.

The present invention aims to provide an engine and transmission assembly which is quick and simple to assemble.

Accordingly the present invention provides an engine and transmission assembly comprising an engine and a transmission having a casing, the engine and transmission casing each having retention means thereon with cooperating surfaces arranged to engage on rotation of the transmission casing relative to the engine to retain the transmission on the engine.

Preferably the retention means comprises a plurality of

wedge means arranged to engage on rotation of the transmission casing. This can ensure that the transmission casing is secured in the axial direction.

The retention means may further comprise means defining a plurality of tapered slots for engaging the wedge means.

Preferably axial locating means are provided to locate the transmission axially relative to the engine.

Preferably at least one of the cooperating surfaces is inclined to the axial locating means so that the transmission is located securely relative to the engine when it is rotated.

The retention means may further comprise locking means for locking the retention means in an engaged position.

The locking means may comprise a locking wedge member.

The present invention further comprises a method of assembling an engine and transmission assembly comprising the steps of providing on the transmission casing and the engine retention means arranged to engage on rotation of

the transmission relative to the engine, bringing the transmission into contact with the engine, and rotating the transmission to engage the retention means.

Preferably the method also includes the step of engaging a locking member with the retention means to lock the retention means in an engaged condition.

The present invention also provides connection means for connecting two members together, the connection means comprising a plurality of wedge means on one of the members and means defining a plurality of tapered slots on the other of the members, arranged such that on rotation of one of the members relative to the other the wedge means engage in the tapered slots, and a plurality of locking members each engagable with one of the wedge means to lock it in its respective slot.

Preferably the locking members are wedge shaped.

Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of an engine and transmission assembly according to the invention,

Figures 2 and 3 illustrate the method of assembly of the transmission to the engine, and

Figure 4 is a section through retention means of the assembly of Figure 1.

Referring to Figure 1 an engine 10 comprises a cylinder block 12 and a crankcase 14 and has a circular mounting face 16 for a transmission at one end, which is perpendicular to the axis of the engine. The mounting face 16 has an axially extending rim 18 around its edge. A transmission 20 is enclosed in a housing 22 including a clutch bell housing 24 which has an axially extending rim 26 on its outer edge. The outer diameter of the rim 26 on the bell housing is just less than the inner diameter of the rim 18 on the engine so that the two rims 18, 26 are a sliding fit one inside the other. The rim 18 on the engine has three slots 28 cut out of it and the rim 26 on the bell housing has three radial projections 30 on its outer surface which cooperate with the slots 28 to retain the transmission in position on the engine.

The slots 28 extend in a direction generally circumferential to the mounting face 16 and are tapered in the clockwise direction as seen from in front of the mounting face as in Figure 1. They have a rear edge 32 closest to the mounting face 16 which extends in the circumferential direction, and a front edge 34, furthest from the mounting face 16, which is inclined to the circumferential direction to provide the tapering. At the wider end 36 of each slot 28 there is an opening 38 towards the outer edge 40 of the rim 18, and the wider end 36 of the slot is flared out towards the edge of the rim 18.

The projections 30 have a front edge 42, closest to the edge 44 of the rim 26, which extends in the circumferential direction, and a rear edge 46, furthest from the edge 44 of the rim 26, which is inclined to the circumferential direction at the same angle as the front edge 34 of the slots. The wider end 47 of each projection 30 is inclined to the front edge 42 of the projection such that it makes an acute angle therewith, and is at approximately 90 degrees to the rear edge 46.

A tapered locking member 48 is provided to lock each of the projections 30 into a respective one of the slots 28 as described below. The locking members 48 each have a threaded bore 50 through them for receiving a locking screw 52 which also passes through a slot 54 in the rim 18 of the mounting face from its outer edge to the rear edge of the respective slot 28.

To assemble the transmission to the engine the projections 30 on the transmission casing 22 are aligned with the openings 38 in the slots 28 and the transmission 20 is moved axially towards the engine 10 so that the projections 30 pass through the openings 38 into the slots 28. The transmission casing is then rotated in a clockwise direction as seen in Figure 1 until the projections 30 become wedged in the slots 28. During this process the front edge 42 of the projections and the rear edge 32 of the slots act as locating means to locate the transmission axially relative to the engine, and are urged securely together by the rear edge 46 of the projections and the front edge 34 of the slots which act to urge the transmission towards the engine as it is rotated. The locking members 48 are then placed in the gap left between

the wider end 47 of the projections and the wider end 36 of the slots and the locking screws 52 are passed through the slots 54 in the rim 18 on the engine and into the threaded bores 50 in the locking members 48 and turned to draw the locking members towards the engine. The locking members 50 act as wedges bearing on the wider end 47 of the projections 30 and the wider end 36 of the slots to urge the projections into the slots and retain them there to secure the transmission to the engine. The slots 54 in the rim are wide enough to allow for the locking members 48 to slide away from or towards the wider ends 36 of the slot 28 as the screws 50 are tightened.

Claims

1. An engine and transmission assembly comprising an engine and a transmission having a casing, the engine and transmission casing each having retention means thereon with cooperating surfaces arranged to engage on rotation of the transmission casing relative to the engine to retain the transmission on the engine.
2. An engine and transmission assembly according to claim 1 wherein the retention means comprises a plurality of wedge means arranged to engage on rotation of the transmission casing.
3. An engine and transmission assembly according to claim 2 wherein the retention means further comprises means defining a plurality of tapered slots for engaging the wedge means.
4. An engine and transmission assembly according to any foregoing claim wherein axial locating means are provided to locate the transmission axially relative to the engine.

5. An engine and transmission assembly according to claim 4 wherein at least one of the cooperating surfaces is inclined to the axial locating means so that the transmission is located securely relative to the engine when it is rotated.
6. An engine and transmission assembly according to any foregoing claim wherein the retention means further comprises locking means for locking the retention means in an engaged position.
7. An engine and transmission assembly according to claim 5 wherein the locking means comprises a locking wedge member.
8. A method of assembling an engine and transmission assembly comprising the steps of providing on the transmission casing and the engine retention means arranged to engage on rotation of the transmission relative to the engine, bringing the transmission into contact with the engine, and rotating the transmission to engage the retention means.

9. A method according to claim 8 also including the step of engaging a locking member with the retention means to lock the retention means in an engaged condition.
10. An engine and transmission assembly substantially as hereinbefore described with reference to the accompanying drawings.
11. A method of assembling an engine and transmission assembly substantially as hereinbefore described with reference to the accompanying drawings.

Patents Act 1977**Examiner's report to the Comptroller under Section 17
(The Search report)**Application number
GB 9321404.7**Relevant Technical Fields**

- (i) UK Cl (Ed.L) B7H (HDJ, HDK)
(ii) Int Cl (Ed.5) B60K 5/10; F16H 57/02; F16M 1/02

Search Examiner
J L TWINDate of completion of Search
26 NOVEMBER 1993**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

Documents considered relevant following a search in respect of Claims :-
1-11

(ii) ONLINE DATABASE: WPI

Categories of documents

- | | |
|---|---|
| X: Document indicating lack of novelty or of inventive step. | P: Document published on or after the declared priority date but before the filing date of the present application. |
| Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: Document indicating technological background and/or state of the art. | &: Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages	Relevant to claim(s)
A	US 4766777 (HARTZ ET AL)	
A	US 4502279 (FUEHRER)	

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).